



United States  
Department of  
Agriculture

Forest  
Service

Southwestern Region  
Forest Health  
Arizona Zone Office

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File Code: 3420

Date: June 11, 2008

Bryce Snyder  
ADOT Winter Storm Management EO Project,  
Community Relations  
c/o ESMpr  
23 East Fine Avenue  
Flagstaff, AZ 86001

Dear Mr. Snyder;

I have read ADOT's Winter Storm Management Environmental Overview (EO) and want to address the impacts of chemical additives to roadside vegetation located on the National Forests (NF) in Arizona. The National Forests most impacted by ADOT's salt-based chemical additives are Apache-Sitgreaves NF (Highway 260), Coconino NF (Highways 87 and 180, I-17, and I-40), and Kaibab NF (I-40 and Highway 89A). The tree species most impacted by these salt-based additives is ponderosa pine, which is the tree species most likely to occur at elevations where winter storm management is necessary. Although ponderosa pine is known in the literature to be tolerant of roadside salt spray and moderately sensitive to salt in soil<sup>i</sup>, there are many roadways in the state where these salt based chemicals are causing severe damage<sup>ii iii</sup>. Symptoms include tip burn (yellow to brown needle tips with green bases on one-year needles), differential discoloration on the side of the crown closest to the roadway, entire crown of trees with tip burn, branch dieback, topkill, and mortality. The excessive number of dead trees created by the use of chemical deicers along National Forest roadways is creating another roadside hazard since these dead trees often fall on or along side the roadways when they fail.

Even the most tolerant plants die if they are exposed to salt in high concentrations. Salt induced mortality found along roadways indicates that too much salt is accumulating in the soil and then in the trees. Although it is assumed salts will leach out of the soil from rainfall during high moisture years, trees next to roadways will continue to be sprayed seasonally and to accumulate salt through roots, resulting in more damage. Since ADOT just started using Ice Slicer a few years ago, a monitoring program is needed to determine the accumulations of salt in the soil and in vegetative tissue overtime. Since a draft operations manual was not included in ADOT's Draft Winter Storm Management EO, I am interested to know how your monitoring program will be established and if the stakeholders and public will get to view the results. Based on our analysis, most symptomatic trees are within 30 feet of the edge of the roadway. Although an emphasis on day-lighting roads would decrease the amount of salt-based chemicals used on roads and remove many affected trees near the roadway, we are still concerned about the build up of salt-based chemicals in the soil and would like to be provided results of your monitoring work.



If you have questions about this report, please email [mfairweather@fs.fed.us](mailto:mfairweather@fs.fed.us) or call me at (928) 556-2075.

Sincerely,

*/s/ John Anhold for; Mary Lou Fairweather*  
MARY LOU FAIRWEATHER  
Forest Pathologist, Forest Health, Arizona  
Zone

cc: John Anhold  
Kathleen Klein  
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<sup>i</sup> Townsend A.M., Kwolek W.F. 1987. Relative susceptibility of thirteen pine species to sodium chloride spray. *Journal of Arboriculture* 13:9, 225-228.

<sup>ii</sup> Fairweather M.L. 2005. Evaluation of salt toxicity of ponderosa pine along State Highway 260, Black Mesa RD, Apache-Sitgreaves NF. USDA Forest Service, Southwestern Region, Forest Health, Arizona Zone Office, 3 p. Flagstaff AZ.

<sup>iii</sup> Fairweather M.L. 2007. An Assessment of Deicing Salt Damaged Trees Along Highways 87 and 260, Mogollon RD, Coconino NF. USDA Forest Service, Southwestern Region, Forest Health, Arizona Zone Office, 3 p. Flagstaff AZ.